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A "NEW" CULTIVATED SUNFLOWER FROM MEXICO

Charles B. Heiser, Jr.

The study of the origin of the cultivated sunflower (*Helianthus annuus* L.) is still a relatively unexplored field. *Helianthus annuus* (including *H. lenticularis* Dougl.) is a complex assemblage of weeds of roadsides and city dumps, and of plants cultivated for their seeds or for ornamental purposes. From what is known at present it is assumed that the cultivated sunflower arose from a wild or weed type *H. annuus*.

The sunflower was introduced into Europe in the sixteenth century. In the 1758 edition of Dodonaeus (2) the sunflower is mentioned. The seeds of this plant are stated to be flat and long, and somewhat "browne" or "swarte," and formerly were grown in Spain. Gerard (3) in 1597 describes a sunflower with seeds "black and large," and goes on to describe a second kind of sunflower with the seeds "long and black with certain lines or strakes of white running amongst the same." It is quite probable that the sunflower was first introduced into Europe by the Spanish and that this was a black-seeded variety which in all probability came from Mexico or the southwestern United States. The introduction of the striped variety probably occurred at a later date and this plant may have been introduced from the northern United

States or Canada, where the Indians are known to have cultivated sunflowers. The Mammoth Russian variety, which has reentered this country, probably represents an amalgamation of several races.

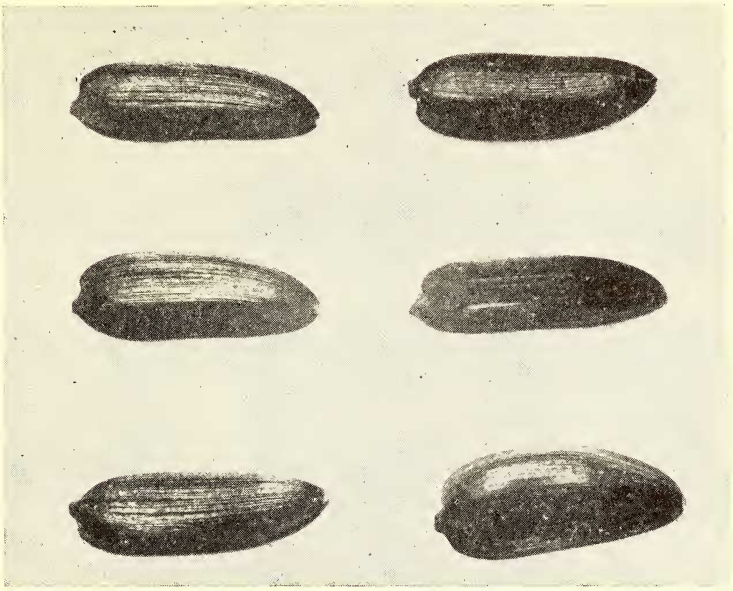

FIG. 1. Achenes of *maiz de teja*, ×2.5.

The earliest description of a cultivated sunflower in Mexico is by Hernández (5), who made his observations during the years 1570–75. Unfortunately neither Hernandez nor any of the other early observers have any reference to the color of the achenes. In 1896 Edward Palmer is reported (7) to have obtained sunflower achenes in Durango, Mexico, and mentioned them as having "a good, plump kernel" and black shells which yield a purplish dye "which is esteemed by some." In the account of the Russian expedition to Mexico in 1925–26, *H. annuus* is recorded as now being cultivated in northern Mexico in limited quantities in maize fields (1). The few samples which were obtained represented late and very late forms, most of which were very tall. Unfortunately a more detailed description is not given.

The finding of a previously unknown cultivated form of sunflower in Teocaltiche, Jalisco, Mexico, by Dr. Carl O. Sauer of the University of California, is of particular interest in this connection. The achenes of this sunflower (text figure 1), called *maíz de teja*[1] by the native from whom they were obtained, were turned over to me for study.

[1] The name *maíz de Texas* is given by Martínez (6) and *maiz de tejas* by Bukasov (1) for Mexican sunflowers.

These achenes, the large size of which undoubtedly indicates a cultivated strain, are long, narrow, and a shining black. In these respects they resemble to some extent the Hopi cultivated sunflower (4), but they are distinguished readily from the modern

Table 1. Comparison of Three Cultivated Sunflowers

Character	Maiz de Teja	Hopi	Mammoth Russian
achenes			
shape	narrow (with beak)	narrow	broad
color	black	purple	gray striped
hypocotyl			
color	red	red	green
length	long	long	short
stem			
pubescence	scattered hairs	scattered hairs	more densely hairy
leaves			
color	deep green, dull	deep green, shiny	light green, dull
size	small	medium	large
margin	nearly entire	slightly serrate	serrate
decurrence on petiole	present	present	usually absent
involucral bracts			
pubescence	medium	light	dense
attenuation	long	short	long to very long
chaff (pales of the receptacle)			
color	purple	purple	green
corolla			
color of lobes	deep red	deep red	yellow (rarely red)
shape	narrow	intermediate	broad
bulb of tube	poorly developed with long hairs	well developed, short hairy to glabrate	well developed, densely long hairy
stigma			
color	purple	purple	yellow (rarely red)
hardiness	weak	fairly robust	very robust
maturation	very late	late	early to late

Russian cultivated strains which usually have a plumper seed and never develop such a deep pigmentation. The small beak present on the upper portion of this Mexican achene, however, is an outstanding character and it appears to be unique among the annual sunflowers.

In order to make further comparisons, these and several other lots of sunflowers were grown in an experimental plot at the Missouri Botanical Garden during the summer of 1945. The plants grown from the seed obtained in Teocaltiche were extremely late in maturing and were destroyed by a severe October storm while still in the "bud" stage. All of the other sunflowers growing in the same experimental plot, including a number of modern Russian varieties as well as the Hopi sunflower and weed sunflowers,

had already matured their seed by this time. It may be significant that *maíz de teja* failed to flower in this particular environment. Perhaps through long selection *maíz de teja* has become adapted to a particular set of growing conditions.

During the winter of 1945–46 samples of the Mexican, Hopi, and Mammoth Russian sunflowers were grown in the greenhouse of the Division of Genetics, University of California, Berkeley, in order to study the behavior of the three strains when grown under presumably identical conditions. There are still insufficient data to draw any final conclusions regarding the relation of these three strains to each other. The Mexican plants appear to be rather closely allied to the Hopi plants in a number of characteristics, the most notable exceptions being the nature of the pubescence and the attenuation of the involucral bracts. In the latter character the Mexican plants approach the condition found in the Mammoth Russian variety. The Mexican plants again were the last to mature under greenhouse conditions. Some of the outstanding differences and similarities that have been observed thus far in these three varieties of sunflower are tabulated in Table 1.

The exact relationship of these Mexican sunflowers to the cultivated sunflower of the Hopi and to the various types cultivated in Europe and North America scarcely can be discussed in the light of the published evidence now available. Fortunately, sunflower seeds of various types have been found at different prehistoric sites in the United States. When these have been carefully surveyed and analyzed the problem will take more definite shape. It is also highly desirable that additional information be obtained on the primitive sunflowers of Mexico.

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